

Calculating greenhouse gas emissions – electrical appliances

Greenhouse Gases (GHG) - All electrical appliances in your school use energy and create greenhouse gases.

By counting the number of appliances such as light fittings, computers, heaters, fridges, radios, Smartboards etc, and estimating the number of hours each week they are used, you can calculate the amount of greenhouse gases created per item (kg CO₂).

Follow these steps to calculate emissions for **electrical appliances**:

Step 1. Calculate the kilowatt hours (kWh) of your appliances (you may have already completed this step in your audit).

Hours per day appliance is on (hrs) x days per year
appliance is on (days) x watts ÷ 1000
= kilowatt hours (kWh)

$$\frac{\text{hrs} \times \text{days} \times \text{Watts}}{1000} = \text{kWh}$$

Step 2. Next multiply the kilowatt hours (kWh) by the Emissions Factor (EF) for your state (see box below).

$$\text{kWh} \times \text{EF} = \text{GHG (kg CO}_2\text{)}$$

Example for a Smartboard used in a Victorian School, turned on at the beginning of each school day:

Power rating: 450 watts

$$\frac{6\text{hrs} \times 200\text{ days} \times 450\text{ watts}}{1000} = 540\text{ kWh}$$

EF in Victoria = 1.17

$$540\text{ kWh} \times 1.17 = 631.8\text{ kg (CO}_2\text{e)}$$

Purchased electricity Emission Factors:

EF-VIC = 1.17
EF-WA = 0.78
EF-QLD = 0.82
EF-ACT = 0.87
EEI-SA = 0.62
EEI-NSW = 0.87
EEI-TAS = 0.20
EEI-NT = 0.69

Calculating greenhouse gas emissions – gas appliances

To calculate GHG emissions for gas calculations to work out the greenhouse gas emissions. The biggest difference is the units, using joules, gigajoules and megajoules instead of watts and kilowatts.

Typical power ratings for gas appliances are displayed as megajoules (MJ) instead of Watts. So you may have an oven with a rating of 12 MJ. This means that this oven uses 12 MJ per hour of baking.

Follow these steps to calculate emissions for **gas appliances**:

Step 1. Calculating the amount of time the appliance is on per year (you may have already done this in your energy audit).

Step 2. Convert to gigajoules (Gj).

Hours per day appliance is on (hrs) x
days per year appliance is on (days) x
megajoules (MJ) ÷ 1000 = gigajoules (GJ)

$$\frac{\text{hrs x days x MJ}}{1000} = \text{GJ}$$

Step 3. You will then multiply the GJ by the emissions factor.

The complete equation for calculating the emissions for gas appliances for your state:

$$\text{hrs x days x MJ} \div 1000 \times \text{GEI}$$

NOTE: The Emission Factors for natural gas and bottled gas LPG are different. Check with your school office to see which type your school uses.

Emission factor for bottled gas LPG
(Australia)

0.05990 kg's per Mj's

Emission factor for natural gas
(Australia)

0.05133 kg's per Mj's

